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Some Diseases of Dairy Cattle *

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I propose to confine my remarks in this address to some observations on those diseases of dairy cattle discussed in the Report of the Survey Committee of the National Veterinary Medical Association in 1941 and which form the subject of the control scheme initiated at this time.

Mastitis

It must be recognized that there are several distinct forms of this disease caused by different aetiological agents and varying in their clinical manifestations. The classification of mastitis into various forms has usually followed the nature of the infecting micro-organism. This has been considered a more satisfactory classification than a clinical or pathological definition since the different forms may at times show the same clinical and pathological picture during the course of the disease.

(Here, a chart was shown in which the various forms of mastitis were described.)

Of all the forms of mastitis, the most commonly encountered in dairy herds is that form caused by *Str. agalactiae*. According to information presented to the Survey Committee, the disease accounts for about 80 per cent. of all clinical cases and in a recent survey in 64 clinical cases carried out at Compton it was found that 78 per cent. of all cases were accounted for by this organism. Moreover, the disease is widespread in dairy herds and the infection rate is quoted variously as between 30 per cent. and 60 per cent.

The disease is insidious in onset, pursues a chronic course, exists as a catarrhal affection of the gland leading to fibrosis and atrophy of the affected quarters. Reduction in milk yield is an invariable finding in affected quarters which may secrete as little as 1-15th of the yield of normal, unaffected quarters. The disease is contagious and surely must be classified as a disease following upon domestication and exploitation of the cow for milk production.

Other conditions affecting the cow's udder are generally sporadic in occurrence but may on occasion assume a formidable role among dairy cows on certain farms. Particularly is this so with *C. pyogenes* mastitis which may be serious in certain years.

CONTROL OF STREPTOCOCCUS MASTITIS

With the knowledge that the disease is contagious, methods of control are directed towards detecting the infected cow and milking her after the clean cows.

The most certain method of diagnosis is the bacteriological test which involves examination of the milk in special media. Such tests can, of course, only be performed in a laboratory and there is, at the moment, a singular lack of suitable centres capable of aiding practitioners in making a diagnosis of the extent of infection in dairy herds. In future, it will be necessary to provide a better service in this respect and it is desirable that every county should have a central laboratory capable of carrying out ordinary routine bacteriological and other tests designed to aid the practitioner in his diagnosis.

The results obtained in the control of mastitis by bacteriological tests applied regularly are entirely dependent on the measures which the owner, and particularly his dairy personnel, are prepared to take daily at the time of milking. The experience which I have gained leads me to the following conclusions:—

1. In hand-milked herds with a small number of milking cows, the spread of infection can be controlled provided (*a*) a suitable antiseptic, such as hypochlorite solution, is used for washing cows' udders, (*b*) separate cloths are used for this washing and milkers wash their hands in antiseptic between the milking of cows.

2. In hand-milked herds where these precautions are not rigidly carried out the results are disappointing.

3. In machine-milked herds that are hand-stripped the results are equally disappointing if hand disinfection is not carried out.

4. In machine-milked herds the control of the disease is more easily effected provided a satisfactory technique is practised for sterilizing teat cups between cows.

In the larger dairy herds to-day it is exceptional to find hand milking alone practised and milking is carried out by machine alone or machine milking is followed by hand stripping. The widespread use of the machine has, of course, been dictated by shortage of skilled hand milkers together with a disinclination of the present-day dairyman to undertake the more laborious method of milking. During war time there has also been a serious lapse in the practice of cleanliness at milking and the conditions one sees in certain farms leave much to be desired. So often the practice of "clean" milk production is diametrically opposed to the principles of disease control. For example, in order to make the udder look clean, a dirty, wet cloth may be taken round from cow to cow, thus spreading *Str. agalactiae* infection. It is quite unnecessary to contaminate the udder in this way, especially in summer when the cows are generally free from obvious dirt.

In view of the fact that, after the milk of infected cows, milkers' hands constitute the largest reservoir of infection, it is to be recommended generally that hand milking or stripping should be dispensed with. This would probably lead to some loss in milk in certain cows, especially when stripping is first abandoned, but once the cows have accustomed themselves it may only be necessary to hand strip those which do not let down their milk completely to the machine. As a rule this applies only to certain cows in the herd but if heifers are started on the machine and this is properly managed as regards pressure and pulsations, there is no appreciable loss in milk. In my experience, in those herds which have settled to the routine of machine milking it would seem to be a waste of time to hand strip since the strippings only amount to a pint or so of milk in most of the cows.

The production of the maximum quantity of milk by the machine method has been studied by Petersen in America who has advocated the application of the machine within five to ten minutes of any primary stimulus applied, such as feeding the cow or washing the udder with warm water. This stimulus is dependent on the secretion of a primary pressor hormone—oxytocin—from the pituitary gland which is concerned with the "letting down" of milk, the effect of which only lasts for ten minutes after the application of the stimulus.

With regard to accommodation of dairy cows, it is clear that the modern milking bail offers better facilities than the byre for (1) sterilization of milking machine clusters between cows, (2) washing of the udder immediately before milking.

TREATMENT OF STREPTOCOCCUS MASTITIS

In the past, extensive use has been made of the flavine dyes injected in solution into affected quarters. It may be said that on the whole they have not given favourable results since they are irritant in concentrations which are efficient in sterilizing infection. With the advent of the sulphonamides and their successful application in human medicine, oral administration of these drugs has found favour in the treatment of mastitis. The results have been variable and in extensive trials made in this country it has been found that about 60 per cent. of clinical cases were improved by treatment but that no more than 30 per cent. bacteriological cure was obtained.

Since 1942 attention has been focused on the injection of substances directly into the udder. Our own work has been centred on the use of (1) sulphanilamide prepared in a oil-water base, (2) tyrothricin injected in an aqueous solution, and (3) penicillin injected first in a oil-water base and later in aqueous solution.

We tried these substances on 64 cows, all of which were affected with clinical disease.

The cows were arranged into three groups and treated as follows: Group 1 four daily injections of sulphanilamide 30 per cent.; Group 2, two daily injections of tyrothricin, 150 mg.; Group 3, two daily injections of penicillin, 10,000 units.

The results showed that 80 per cent. of quarters infected with *Str. agalactine* could be sterilized by four or more injections of sulphanilamide; 78 per cent. with tyrothricin and 65 per cent.

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with penicillin. We were, of course, severely handicapped in the use of an adequate dosage of penicillin by the extremely short supply of the drug then available. Later trials have shown that infection can be sterilized in about 80 per cent. of quarters by two daily injections of 20,000 units.

We found that the character of the secretion was improved during the daily injections of sulphanilamide and in the majority of the streptococcus cases the milk became normal within three days of completing treatment. The drug was non-irritant when injected into the gland provided the suspension was properly prepared from finely ground powder. Tyrothricin, on the other hand, was slightly irritant although giving good bacteriological results. Penicillin gave a poorer response in this preliminary trial, but the drug was non-irritant and the character of the secretion was quickly improved. We found also that in quarters which were affected to a degree where there was considerable fibrosis and atrophy of the quarter, the milk yield was not restored in the same lactation but that often complete restoration occurred in the next lactation.

The application of these substances for the treatment of quarters affected with *C. pyogenes* was not successful but in staphylococcal mastitis, penicillin gave encouraging results provided daily injections were continued for five days.

It is possible to apply sulphanilamide and penicillin extensively in dairy herds to combat the existing high infection due to *Str. agalactiae* and since their application does not interfere with milk production, early latent cases can be treated as well as clinical cases. Therapy alone, however, will achieve only a temporary reduction in the incidence of infection since it cannot be claimed to give complete success. Therapy, therefore, needs to be supplemented by a rigorous method of hygienic control practised at the time of milking.

Contagious Abortion

Since 1909 the control of the disease has been attempted by segregation of animals reacting to the agglutination test which was first employed by M'Fadyean.

At the same time Bang (1909) showed that vaccination of non-pregnant heifers with living culture reduced the number of abortions when the animals were exposed to infection during pregnancy. After this, living cultures were extensively employed but as early as 1911, Shroeder & Cotton showed that *Br. abortus* could be secreted in the milk. Later, in 1918, when Alice Evans showed the close similarity of *Br. abortus* and *Br. melitensis*, it was realized that a serious infection might be transmitted to human beings by means of infected milk. Therefore confidence in the use of vaccination was gradually undermined and the use of the method could not be justified in the interests of public health. Consequently in this country, vaccination was discouraged in licensed herds and fresh impetus was given to the eradication of the disease by blood testing and segregation. Further experimental work was therefore instituted by the Agricultural Research Council in 1930 to test the value of the method and find out whether success similar to that achieved in the U.S.A. could be attained. Variable results were achieved, not because the agglutination test was inaccurate but because in districts with a high cattle population progress was slow and uncertain. In some herds, it was shown that by segregation the spread of infection was controlled but it was found difficult to maintain herds free from infection for more than a limited time.

Concurrently, search was being made both in this country and in America to discover strains of low virulence for vaccination which were free from the objection that they persisted in the tissues of the bovine and were excreted in the milk.

In 1925, Buck tested many strains of *Br. abortus* in the U.S.A. Bureau of Animal Health Laboratory. One culture, named strain 19, was found to produce a good immunity and did not localize in the udder; also this strain only caused lesions in a percentage of guinea-pigs although agglutinins were produced. The same worker practised calfhood vaccination with virulent cultures with good results, while Cotton, Buck & Smith (1934) vaccinated some 70 calves in a number of experiments using strain 19 at four to eight months of age. Of the controls, 75 per cent. aborted when immunity was tested in their first pregnancy while only one out of seventy vaccinated animals aborted and eight were infected. Later, in 1936, the Bureau of Animal Industry vaccinated 17,000 calves between five and seven months of age with the result that only 1·6 per cent. aborted due to *Br. abortus* when the cattle were followed to their third pregnancy. The evidence published by American authors shows that immunity is good during the first pregnancy following vaccination during calfhood while Delez (1940) found that of nine animals tested with a heavy dose in their second pregnancy, six gave birth to full-time living calves and three calved prematurely. Evidence also exists that calfhood vaccination confers immunity up to the fourth pregnancy.

There is no confirmatory evidence in this country regarding the duration of immunity acquired in calfhood, and this requires to be submitted to an experimental investigation. One advantageous feature of calfhood vaccination is that the agglutination titre tends to fade out so that vaccination should not interfere with an eventual policy of eradication based on the use of the blood test.

McEwen in 1940 described strain 45 (20) as a culture of the twenty-fifth passaged variant of an original avirulent strain of *Br. abortus*. After passage it became rough and in this phase did not produce smooth agglutinins. The inoculation of this strain into non-pregnant heifers was found by McEwen to confer considerable immunity and the strain did not persist in these heifers.

A comparison of the immunity conferred by these two strains in groups of vaccinated heifers has been carried out at Compton and the results have recently been published.

The Ministry of Agriculture and Fisheries approved two vaccines for use under the Survey Scheme in 1942, No. 1 (strain 19) and No. 2 (45/20), but following the evidence obtained in subsequent tests vaccination was limited to one vaccine in January, 1945. The Chief Veterinary Officer announced at this time also that he was able to secure the sanction of the Ministry of Health, after consultation with the Medical Research Council, for removing the embargo of 1942 on the use of living vaccine in non-infected tuberculin-tested herds, with the result that vaccination with strain 19 has been widely applied and 200,000 calves were vaccinated in 1945.

Sale of Cattle Vaccinated with Strain 19

Since strain 19 causes agglutinins to develop in the blood of vaccinated cattle, it has been realized that cattle exposed for sale subject to freedom from contagious abortion must have evidence that agglutinins present in their blood are primarily due to vaccination and not due to natural disease. Some breed societies which have insisted that all entries at their special sales should have recently passed an agglutination test have felt the need of protecting the purchaser against the purchase of an infected animal which an unscrupulous vendor might offer for sale as a vaccinated animal. In the case of animals vaccinated as calves the incidence of positive reactions at the time of sale at first calving should be very low but animals vaccinated at a later age may show positive reactions. Accordingly such animals exposed for sale should be accompanied by a certificate showing (1) that it passed the test at the time of vaccination, (2) the titre of the agglutination test 35 days after vaccination (which denotes the maximum level of response), (3) the titre six weeks before sale.

This limitation of strain 19 in causing an agglutination response is not, however, a serious drawback to its general use since the number of cattle which are pedigreed and therefore embraced by the sales of breed societies constitute only 3 per cent. of the total stock.

Future Development in Control of Contagious Abortion

It should be understood that calfhood vaccination was adopted in certain States in America as an adjunct to the test and slaughter policy adopted by the majority of the States. The policy of vaccination enabled the immunization of calves to be carried out without causing them to react as adults, thus no delay was caused in the final eradication of the disease. In this country the incidence of abortion is much higher than in America and a policy of slaughter cannot be adopted because of the high individual value of animals. To combat the exposure of animals to the higher infection prevalent in Britain, therefore, the aim should be to confer immunity on the largest possible number of animals by widespread vaccination. It would be prudent also, therefore, to repeat vaccination after successive calvings in herds where abortion has been prevalent.

The eradication of the disease from the country is obviously a matter for a national policy which should be developed in the first place as a concerted plan within circumscribed areas. The Animal Health Division should be in possession of the data for all herds forming a convenient area showing the infection rate in individual herds. These could be divided into (1) herds showing the presence of infection which might be dealt with by vaccinating all non-infected animals; (2) herds now free from infection in which calves only need be vaccinated.

Johne's Disease

In 1929 Major G. W. Dunkin presented a paper to the Annual Congress of the National Veterinary Medical Association in which he made the following observation: "In my view this country is unique in that it possesses a larger percentage of infected cattle than any other and if this statement is correct it should have been the first to organize research with a view to the ultimate elimination of the disease, whereas officially no attempt has been made to curb its advances and preventive and curative measures are left to the

general practitioner. I hold the view that in Johne's disease we have a condition to attempt a cure of which is not an economic proposition. It is rarely possible to isolate the infected animal adequately and, unlike tuberculosis, dissemination of infection in the faeces is a constant feature of practically all cases of Johne's disease."

This criticism by Dunkin is largely true if it is applied to the progress made in recent years but it would be a great failure on our part not to appreciate and give due recognition to the pioneer work carried out by M'Fadyean and his colleagues (1916) which contributed largely to our present knowledge of the mode of infection, pathology, diagnosis and treatment of the disease. To Dunkin also and to Minett (1935) is credit due for their work on the development of methods of diagnosis using the allergic skin test.

The following short summary of our existing knowledge may be given:—

The disease is caused by a specific organism, *Mycobacterium paratuberculosis*, and is located in the intestine and associated glands of affected cattle. Specific changes are found in the intestinal mucous membrane and, in clinically affected cases, intermittent diarrhoea occurs together with rapid and progressive emaciation. The disease is not notifiable and no accurate information is available concerning its incidence. It is probable, however, that the disease is widespread but may only cause small losses in individual herds. Further, it is known that individual cattle offer resistance to experimental infection and that calves and goats up to six months of age contract infection more readily and that beyond that age they are already becoming resistant to infection (M'Fadyean & Sheather, 1916; Hagan, 1938). It has also been found that the disease has a long incubation period, since clinical symptoms may become manifest as long as five months to two years after infection. It is stated that infection in older animals may lead to an allergic state, which may, however, be only temporary and a clinical condition may not develop. The disease may be diagnosed by:—

(1) The presence of acid-fast organisms in scrapings of the intestinal mucous membrane or by examination of the faeces for distinct clumps (Davies, 1945).

(2) Allergic tests using avian tuberculin or johnin. Both these reagents have been used and they have been applied by the intradermal and intravenous routes. Dunkin & Minett carried out extensive investigations on the johnin test in this country on individual animals in which the results of the test were verified by *post-mortem* examination.

The evidence accumulated on the application of the test for the control of the disease in individual herds over a number of years is extremely limited. At Compton we applied the johnin test at six-monthly intervals from 1939 to 1942 in three herds containing 400 head of stock where there was an annual loss of five to ten cows each year from Johne's disease. This loss, although low, is probably representative of the incidence of the clinical condition in herds. Briefly, we found that (1) by segregation of infected animals and immediate disposal of clinical cases the disease was eliminated after four years; (2) the johnin test failed to show a positive reaction in nine out of 30 animals clinically affected with the disease; (3) positive reactions occurred in calves which were sensitized by the presence of avian infection; (4) it was not possible to differentiate the responses to various concentrations of P.P.D. products made from avian and Johne strains in allergic animals.

These defects in the application of johnin, first its failure to detect all clinical cases and second its lack of specificity due to the related identity of the allergy caused by avian infection, suggest that at present the johnin test alone cannot be recommended as a basis for segregation of reactors in herds. It might usefully be employed, however, in conjunction with the avian test for deciding whether an animal was free from infection either by avian or johne bacilli. One could, I think, with confidence regard a completely negative reaction to both reagents as fair evidence that an animal in the *preclinical* stage was free from either infection.

In view of the absence of a reliable allergic test for Johne's disease, the following recommendations for its control may be made:—

1. In view of the susceptibility of the young animal efforts should be directed towards preventing calves contracting infection from adult stock. In most farms practising good husbandry segregation of young stock is already adopted and in so far as the results at Compton are concerned, it is my belief that credit for the control of the disease is mainly due to good husbandry and disposal of early clinical cases. Calves should not be allowed in contact with adult stock and should not occupy the same pastures until their first lactation. The system of alternate husbandry now almost universally adopted on progressive farms fits in well with the pasture management which is conducive to minimizing infection. If for any reason it is undesirable to plough up permanent grassland suspected of carrying infection, it may be anticipated that infection will not survive longer than about six months on pasture during the summer time if the pasture has been well chain harrowed and limed in the spring.

2. Recently interest in the subject of prophylactic vaccination with a living culture has been revived. The method was originally tried in 1926 by Vallée & Rinjard in France and by 1934, 12,000 animals had been treated and the method proved safe. The vaccine consists of a living, unattenuated culture of the Johne bacillus suspended in oil. It is injected subcutaneously and gives rise to a small, inflammatory swelling that is gradually replaced by a fibrocaseous nodule.

Discussion

Mr. F. V. John: With regard to mastitis, all would agree that *Streptococcus agalactiae* was the chief causal organism, and that sulphanilamide would bring a cure in a large proportion of cases. The real difficulties, however, lay with mastitis caused by *Streptococcus dysgalactiae*. This was not affected by sulphanilamide administered by the mouth and possibly this was the only factor which distinguished it from the mastitis of *agalactiae*. Many methods of treatment had been attempted but so far results had been disappointing. Was penicillin in any way effective against *Streptococcus dysgalactiae*? A quick and efficient laboratory service was absolutely essential for the proper control of mastitis. Carmarthenshire needed one desperately. Would the Ministry of Agriculture and Fisheries give us one and add to it a veterinary investigation officer?

As regards what might be termed the hygiene of mastitis, was the action of stripping rather than the contact of the hand with infected milk the predominant factor in the spread of the disease? His own experience was that machine milking was more inclined to spread mastitis than hand milking especially because of the lack of adequate maintenance of the machine.

Might they have more details of the clinical application of penicillin and of its pharmacology? Also more general information of mass herd treatment in mastitis herds?

Would Mr. Edwards advocate making abortion a notifiable disease? In his opinion this would be the only satisfactory method of establishing its control. Calfhood vaccination, in any case, should be made compulsory.

With regard to Johne's disease, the chief trouble that he had was with imported infected English cattle. The seriousness of this was accentuated by the fact that they were always specially selected, valuable cattle. He found the diagnosis of this disease very difficult; were any cultural tests possible?

Mr. Campbell-Hill: In his experience machine milking spread mastitis to a greater degree than hand milking. Mastitis did not seem in every case to depend for its incidence upon bad farm conditions. He remembered enquiring whether any special measures were being taken upon one farm which had very bad buildings and sanitation but on which the cattle had perfect udders. He was told that the cattle were hosed all over with cold water half an hour before milking.

Was the efficacy of penicillin very seriously handicapped by the *p*H of milk? He agreed with Mr. John: they must have a convenient laboratory.

Mastitis hygiene was a matter of personal cleanliness: cleanliness in attendants and cleanliness of cow's udders. This latter was especially important at the end of milking. The drops of milk left on the end of the teat were one of the most certain factors in the spread of the disease.

Mr. T. H. Jones: Did Mr. Edwards refer to the question of stripping or not stripping after machine milking or to the whole question of machine milking or hand milking? With abortion, for how far into pregnancy could one expect any vaccination advantage? He agreed that *Streptococcus dysgalactiae* was the most troublesome type to the practitioner. Would sulphanilamide in oil control it? Might they have more information about vaccination against Johne's disease? Was it effective in not too severely infected herds?

Capt. Davies: The majority of their clients were dependent upon that important animal, the dairy cow; hence it was easy to assess their great interest in Mr. Edwards's paper and that discussion. In his experience, in the first year of dairy routine in which no stripping was practised most cows dried off very suddenly and one had to face the very serious loss of two whole months' milk yield at the end of lactation.

Might they have more information about the vaccination of pregnant animals?

Mr. W. J. Leyshon: Did they know sufficient about S19 to make anti-abortion vaccination compulsory? Remember that in such a case the Ministry of Agriculture would be entirely responsible for its effects. In any case present shortage of staff would make it impossible.

Mr. W. D. John: One of his clients was surrounded by farms badly infected by abortion. What course in vaccination should he follow? Should he vaccinate the younger stock alone?

He had had experience of penicillin treatment to a limited degree and could testify to its value.

As regards Johne's disease diagnosis, he had had difficulty in finding the so-called typical clumps of organisms.

Mr. C. Watson: He did not think that machine milking was responsible for mastitis spread if the machine was used correctly. If the machine was left on for not more than four minutes and no after stripping took place the cow would soon become accustomed to the routine and give a full yield.

Could they have more information about summer mastitis? Was there any satisfactory treatment? They were told that *Corynebacterium pyogenes* was a normal resident in the udder. Why, then, did summer mastitis occur most frequently in July and August when the cow was dry and at its fittest?

Mr. T. R. Thomas: Had Mr. Edwards anything to tell them concerning mastitis in maiden heifers? He had one herd in which abortions were occurring in the third year after vaccinations; should he vaccinate again? For how long after vaccination would calves give a positive agglutination?

Mr. A. J. S. Reynolds: Stripping between the finger and thumb was productive of mastitis. Gentle, whole hand stripping was perfectly safe and would produce no ill results.

The Reply

Mr. Edwards: Replying to Mr. F. V. John, he would say that *Streptococcus dysgalactiae* gave rise to an acute mastitis which might disappear spontaneously. The organism was sensitive both to sulphanilamide and to penicillin. He had treated twelve cases of it with penicillin with good response.

As regards the general method of administration of penicillin, he used a solution in sterile distilled water injected by an all-glass syringe with a flexible metal teat syphon attached. Ten c.c. of solution was sufficient, employing an injection of 20,000 units on each of two consecutive days after afternoon milking. Stripping out was not performed until next morning. Treatment must be early to be successful. Latent cases should be treated as well as clinical cases, so full laboratory facilities must be available.

Machine milking could be controlled more efficiently than hand milking although there was no doubt that hand milking in itself was better than machine

CLINICAL COMMUNICATION

Verrucose Endocarditis

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The omission of the above condition by Mr. G. H. Arthur, when dealing with the differential diagnosis of traumatic reticulitis and pericarditis in his recent valuable paper prompts me to record it as a condition which, in this practice, causes more difficulty than any other.

To date, four cows have been met with, and in each the lesion was confined to the right auriculo-ventricular valve, and consisted of a cauliflower-like growth on the valve, yellow or dark red in colour.

SYMPTOMS: In the early stages the symptoms are almost identical with those of traumatic reticulitis. The onset is sudden and usually the first symptom is a constipation with a severe fall in milk yield, marked depression and a small but variable appetite. Cudding may or may not be in abeyance. The cow is evidently in great pain, standing with an arched back and showing a marked disinclination to move. Pressure over the withers, heart or xiphisternal region causes a severe grunt, which is, if anything, more marked than in a reticulitis. Temperature varies from normal to 104°, although in one case a temperature of 106° has been met. Pulse is much accelerated and is usually from 80 to 120 per minute. Jugular pulse is very faint and until the last stages there is no fullness of the vein. The heart sounds are normal. At this stage the symptoms are so similar to those of a traumatic reticulitis that rumenotomy is invariably decided upon to eliminate the possibility of a penetrating foreign body and only when search of the reticulum is negative for a foreign body and adhesions can the diagnosis be considered definite.

The only symptoms which may be of use in differential diagnosis appear to be the pulse rate, which is usually higher than in a reticulitis, and the greater severity of the pain. (It is difficult to explain the acute general pain of this condition.) Lameness may be significant.

The condition from this point is progressive and pain, inappetence and depression become more marked. The pulse rate increases and the jugular becomes permanently full, although it is surprising how late in the condition this becomes noticeable. The heart sounds on auscultation remain good until the last stages, which is remarkable considering the lesion found on *post-mortem* examination. The intensity of the cardiac sounds is not decreased as in a pericarditis and there are no friction sounds, but the "dupp" becomes progressively more muffled.

The usual secondary oedema of the jowl develops with the filling of the jugular. The course of the condition is variable but is usually ten to 14 days.

Illustrative Case Records

I. *Subject.*—Four-year-old Shorthorn cow.

3.12.46.—Owner called for medicine for what he thought was constipation, and a purgative—Ol. lini Oi; Istin 3iv—and stimulants were given.

6.12.46.—Owner reported no improvement and the cow was seen. Depression and pain were marked and the appetite was almost completely lost. Faeces were hard and small in amount. Temperature 103°. Pulse 80. Pressure over withers or xiphisternum caused a grunt.

A diagnosis of traumatic reticulitis was made but as the owner did not favour an operation, medicinal treatment, consisting of oily purgatives and stimulants, was continued, the only effect being that the cow scoured.

9.12.46.—No improvement and the owner consented to an operation. Rumenotomy was carried out with negative results and the diagnosis changed to that of endocarditis with a hopeless prognosis.

14.12.46.—Jugular was now full and pulse 110. The cow was slaughtered and the only lesion found was the proliferation on the right auriculo-ventricular valve.

During a discussion of the case with the owner, he volunteered the further information that in May, 1946, the cow had retained the placenta, which was drawn on the fourth day, and that a few days before the onset of the acute symptoms had shown a lameness which he ascribed to some injury and to which he paid little attention.

II. *Subject.*—Four-year-old Shorthorn, six months pregnant.

23.12.46.—Noticed lame in the left hind leg. On examination there was evidently some swelling of the joints and the temperature was 106°. Fomentations were ordered and acetanilide 3ii b.i.d. prescribed.

26.12.46.—Temperature still 106° and the cow was blowing hard although auscultation revealed no abnormality in the lung sounds. Pain was very marked, and the cow showed a disinclination to move, standing rigid with the head extended and showing a strained expression. Pulse 100. She refused to lie normally but instead rolled over on her side and lay at full stretch, grunting badly. Pressure over the back, ribs and abdomen caused marked grunting.

A generalized infection was diagnosed and the cow was given sulphanilamide 4 oz. and sodium chloride 8 oz. by stomach tube.

27.12.46.—Marked improvement. Temperature 102°, but pulse still very fast. Appetite good and cudding well.

28.12.46.—Temperature 106° with return of the acute symptoms of 26.12.46. The lameness was now in the right hind leg and there was swelling of the fetlock joint. Sulphanilamide was repeated and the symptoms were immediately relieved, but as the sulphanilamide was excreted, so they returned. The pulse throughout remained about 100. The sulphanilamide dosage used was 4 oz. as a first dose followed by 2 oz. b.i.d.

Sulphanilamide was continued until 6.1.47 with marked improvement

8.1.47.—Temperature again 106° with return of acute symptoms. A slight jugular pulse was noticeable but there was no abnormality of the cardiac sounds. At this stage a tentative diagnosis of endocarditis was made and large doses of sodii sal., 3iv b.i.d. prescribed, until 12.1.47 with no improvement.

As it was now obvious that medicinal treatment was of no avail, it was decided to perform an exploratory laparotomy as the pain seemed peritoneal in origin. A left flank laparotomy was performed and an examination made of the peritoneal cavity within reach. Between the anterior aspect of the rumen and the liver a soft gelatinous mass was felt with adhesion to the rumen wall and liver capsule. Rumenotomy was then performed, but no evidence of a foreign body nor any adhesions were found in the reticulum.

Sulphanilamide 4 oz. followed by 2 oz. b.i.d. for three days and sulphamezathine 2 oz. b.i.d. for three days were then persevered with, but by 19.1.47 the cow's condition was such that slaughter was decided upon.

On *post-mortem* examination the lesions between the rumen and liver proved to be a gelatinous straw-coloured mass, consisting of organized serous exudate. The liver glands were enlarged.

On opening the heart, the right auriculo-ventricular valve showed gross vegetations. The articular surfaces of the right hock joint were eroded. The fetlock joint was not opened but was sent, together with the heart and liver glands, for bacteriological examination. The report showed that the joint surfaces were normal, but that there was an inflammation around the flexor tendons. Bacteriological examinations showed a few streptococci only.

DISCUSSION

The most remarkable feature of an endocarditis appears to be the general acute pain caused. It is difficult to understand why

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milking for maximum production of milk. Cows could, however, be trained to give milk by the machine without stripping.

Penicillin in oil had been tried in mastitis but appeared to have no advantage over aqueous solution. Penicillin when injected in large volumes of diluent or when normal saline was the diluent proved slightly irritant.

Compulsory anti-abortion vaccination might become part of an area plan. The isolation of free herds was practically impossible. There was no doubt that some national control scheme was overdue.

In the microscopic diagnosis of Johne's disease clumps of organisms alone should be taken as a positive: single acid-fast organisms were not diagnostic. Possibly a series of faecal tests would give more reliable indications in detecting infection.

He had always taken the *p*H of penicillin in distilled water as used in udder infusions as 7. This would approximate to the *p*H of milk.

In those reported cases of mastitis in which tests of the milk showed no bacteria, it might be that the culture media were at fault or that there was a variable secretion of bacteria from the udder. He would recommend repeated consecutive tests.

In France vaccination against Johne's disease was widely practised. Frequently a lump at the site of injection was produced which lasted for some months. He did not think that vaccination in this country could be regarded at present as being anything more than experimental.

Very possibly there might be a response in penicillin treatment of *Streptococcus uberis* mastitis. Staphylococcal mastitis should also respond in a fair percentage of cases but might require a total of 500,000 units in six daily injections. As regards vacination of pregnant animals against abortion, his advice was to vaccinate the whole herd if necessary. There was evidence that this caused no abortion nor was the organism recoverable from the animal afterwards. In the case quoted by Mr. W. D. John, it was obviously not safe not to vaccinate: if not the whole herd, the calves at least. He knew of no easy cultural tests for Johne's disease nor of any biological tests.

Early penicillin treatment in summer mastitis was worth trying, but no reliable data were available as yet regarding its efficacy. He could suggest no other cure. The problem was worthy of much more study. His view was that flies were the chief cause of spread. He classed maiden heifer mastitis in the same category as ordinary summer mastitis.

The breakdown of immunity after abortion vaccination mentioned might be due to infection before vaccination. His advice was to re-vaccinate.

Agglutinins took a minimum of twelve months to disappear after abortion vaccinations in at least 90 per cent. of calves. Breed societies were now producing various forms of rules applicable to this.

NEW INSTRUMENTS AND APPLIANCES

[The Editorial Committee desires to make this Section a regular feature of *The Veterinary Record* and would welcome contributions accordingly. Their publication, however, carries no implication that the instrument or appliance concerned is necessarily recommended by the Committee.]

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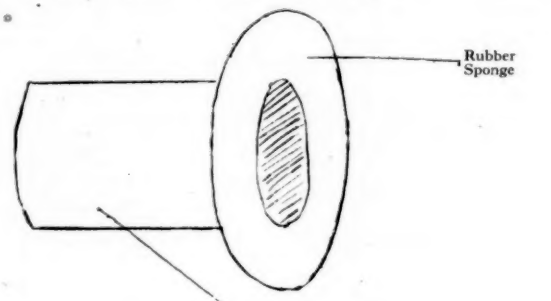
Protective Attachment to Artificial Vagina

In view of the increased number of veterinary surgeons both at inseminating centres and in general practice who are using artificial vaginas and in view of the damage that can be done by inexperienced operators or vigorous thrusting bulls on account of the hard texture of the end of the artificial vagina, an extra appliance which has been used at the Hampshire Cattle Breeders' Society's Lyndhurst Centre for several months may be of interest to our readers.

At the suggestion of Mr. E. Conn, M.R.C.V.S., Chief Veterinary Officer at the Centre, the Holborn Surgical Instrument Co. Ltd. have made an appliance which can be fitted on the end of the artificial vagina. This has a rubber arm which can overlap the end of the artificial vagina and a sponge rubber end which would tend to obviate the possibility of discoriation of the epithelium, due either to inexperience or vigorous thrusting.



Rubber arm to fit over end of A.V.

ABSTRACTS

[On a New Type of Distemper Virus. Verlinde, J. D. (1946.) *Tijdschr. Diergeneesk.* **71**. 210-215.]

Two dogs vaccinated against distemper three months and six months earlier, by the vaccine-virus method and by a formolized vaccine respectively, developed the clinical signs of distemper. Saline suspensions of discharge from the eyes and nose of these two dogs were successfully used for serial transmission of the condition to a total of nine puppies, the inocula for some of the passages being bacteriologically sterile. Cross-immunity tests on six recovered puppies provided some evidence that the infective agents isolated from these two dogs were immunologically distinct from the classic distemper virus. The author claims, in fact, to have isolated a virus from a form of distemper which differs immunologically from the only hitherto recognized distemper virus and he suggests that the classic virus be called type A and this new infective agent distemper virus type B.

W. M. H.

the valvular lesion should be responsible, and it is only reasonable to ask whether the pain is, in fact, a general muscular pain associated with a generalized infection, to which the endocarditis is secondary. The involvement of the right auriculo ventricular valve in all four cases suggests this theory. It might be suggested that in Case I the primary lesion was the metritis, but it is difficult to account for the period of normal health between May and December, particularly in view of the acute nature of the condition from 3.12.46. The patient in Case II had never previously shown any illness and one wonders whether the localized peritonitis, for which no cause could be found, was the primary lesion.

The general character of the illness in this case immediately brought to one's mind acute rheumatism.

[Occurrence of Two Immunological Groups in the Genus Listeria. Drew, R. M. (1946.) *Proc. Soc. Exp. Biol., N.Y.* **61**. 30-33.]

Previous studies on the antigenic structure of the genus *Listeria* (*Listerella*) have been carried out by various workers using agglutination and agglutinin-absorption methods. There is agreement that two main types have been discerned. The first includes the rodent strains and the second those from ruminant sources. Strains from poultry, animals other than ruminants and the bulk of the strains of human origin fall into one or other of these groups. There is some evidence that certain strains of human origin are not identical with these two main types.

Using a polysaccharide obtained by formamide extraction as the precipitinogen and sera, prepared by vaccinating rabbits with formolized bacterial suspensions grown at room temperature, the author confirms the existence of the ruminant and rodent groups and that strains of human origin can be placed in one or other of these groups. One of the strains of human origin behaved peculiarly. The antibacterial serum against this latter strain (Nyfeldt) precipitated the carbohydrates of the rodent group but the Nyfeldt carbohydrate, although reacting with its homologous immune serum, failed to precipitate with the antibacterial sera prepared against the rodent strains. This fact, coupled with the observation that this Nyfeldt strain and another human strain, 'Gibson,' have some antigenic relationship with haemolytic *Staph. aureus*, suggests that certain strains of human origin though similar to members of the rodent group are not identical with them in all respects.

J. S. P.

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[Bone Pinning in Fractures of Small Animals. Ehmer, E. A. (1947.) *J. Amer. vet. med. Ass.* **110**. 14-19.]

The author reviews the methods of handling fractures in small animals. Certain fractures, in particular those involving the humerus, femur and pelvis, often heal without treatment, other than confining the animal in a small pen. Some fractures, *e.g.*, of the radius and ulna, may be put in a cast, but the results are usually not entirely satisfactory. In other cases the application of a cast will actually hinder healing by increasing mobility, especially a fracture occurring above the middle of the hind limb. Healing can often be induced by forcible flexion in a sling cast. However, fractures treated by any of these methods are rarely adequately set, and although healing does occur, overlapping, shortening and angulation are the rule. Bone wiring and plating are dismissed as unsatisfactory in small animals, owing to the small size of the bones, seriousness of infection and difficulty of adequate immobilization following the operation. The practice of placing steel pins directly into bones is not new. It was a European idea, which has been adopted and improved upon by American workers, in particular, Dr. Stader and Dr. Anderson.

The features of the Kirschner splinting equipment are described. It has been developed for small animals and consists of a number of pins, which are inserted into the bone substance; a hand chuck, for inserting the pins; clamps to fit the pins; fixation rods, and a reduction gear. The pins are inserted directly into the bone ends at a converging angle and completely penetrate the bone. They are placed as near the divided ends as practicable to facilitate manipulation. Two pins are placed in each fragment and each pair should be in line. Ideally all four pins should be in alignment. The hand chuck has a hollow handle so that one can regulate accurately the depth of the pin. An instrument called the Gordon Extender is used to produce proper alignment and to minimize overriding and shortening. Radiography before splinting is desirable, in order to ascertain the degree of manipulation necessary.

The technique is described. The Gordon Extender is applied for varying periods up to 30 minutes until adequate reduction is obtained. The site and surrounding areas are carefully prepared: "there can be no dirty surgery practised when bone pinning is under consideration." Draping is performed, preferably with dry cloths, and the drapes applied so that the limb in question can be freely manipulated. The pins are plunged through the soft tissues, the bone is located, proper angulation and alignment are decided upon and the pin forced into the bone substance by a back and forth half turn. The pin is adjusted in the chuck so that it penetrates the entire width of the bone, protruding about one-quarter inch. The texture of the bones is variable, being hard in old dogs, soft in young, and of a characteristically crumbly nature in post-distemper cases. The pins cut the skin somewhat and sulphonamides are applied daily. If the temperature rises above 102° F. the administration of penicillin is begun. The pins are removed when union is solid. They are removed usually without pain by means of the chuck or pliers.

The chief indications for this method of treatment are: fractures of the femur, in particular epiphyseal fracture of distal end; fracture of the elbow point, humerus, any portion of the mandible, including symphyseal fracture—also for radius and tibia.

[*Abstractor's Note.*—The inclusion of diagrams or photographs would have made an understanding of the nature of the apparatus and technique of operation more complete. In any event, it is not possible, by means of an abstract, to impart all the information the practitioner requires; consequently, interested readers are strongly advised to consult the original.]

P. K.

REPORT

[Animal Husbandry Department, United Provinces: Report for the year 1944-45.]

The Animal Health Department was created in January, 1944, under the directorship of Mr. F. Ware, C.I.E., F.R.C.V.S., to unify the various activities connected with livestock development and disease control.

The existing Veterinary Department was amalgamated during the year with the new Animal Health Department and the activities of the D.V.S. were closely co-ordinated with those of the Department of Animal Health.

This amalgamation of veterinary activities, which includes "Fisheries," was largely brought about by war-time emergencies creating insistent demands for more and more animals and animal food and, with the cessation of hostilities, there should be a big future for this department, both in increasing and improving the livestock population for the benefit of the people.

"It is to be hoped that the lessons learnt will not soon be forgotten, for there is no doubt that the health of the people in India would be considerably improved if more animal fat and animal protein, contained in such foods as milk, ghee, eggs and fish, could be made more permanent constituents of the diet of the civil population."

Disease Control.—Rinderpest and haemorrhagic septicaemia appeared to cause most trouble as epizootics. Some 162,000 anti-rinderpest inoculations and 388,000 inoculations for the control of haemorrhagic septicaemia were effected. Naganol and antrypol were used for the treatment of surra. Foot-and-mouth disease, blackquarter and anthrax were recorded but no deaths occurred amongst equines from either glanders or anthrax.

At veterinary hospitals some 745,683 cases were treated; medicine was supplied to some further 85,308 cases not brought to hospital, whilst Veterinary Assistant Surgeons treated 109,598 cases on tour.

Laboratory Service.—1,219 smears and other morbid material were examined at central and circle laboratories. Anti-rabic vaccination was carried out on a number of dogs with varying result. Anti-rinderpest dessicated goat spleen vaccine was introduced for routine field use in several districts and was used both in outbreaks and as a prophylactic with good results. Extensive experiments on the manufacture of this vaccine in pillule form with a suitable injector gave promise as a simple means of application. Tuberculin, johnin and Brucella agglutination tests were carried out on cattle and buffalo.

Poultry disease investigation received due attention and over 10,000 vaccinations against Ranikhet disease, fowl pox and fowl cholera were effected.

The sections of the report dealing with such important subjects as Nutrition, Marketing, Breeding and Development, Fisheries, etc., show that much care and thought has been given to each aspect of a complex problem and augurs well for the future of the livestock industry in the United Provinces.

S. A. E.

REVIEW

[Gestation Periods, a table and bibliography, compiled by J. H. Kenneth (1947), Technical Communication, No. 5, Second Edition. Imperial Bureau of Animal Breeding and Genetics.]

This publication gives records of average, maximum and minimum gestation periods for a large number of species and breeds of animals complete with a bibliography of over 400 references. Data on 35 additional species have been collected since the first edition and over 100 references have been added to the bibliography. Additional cross-references have also been included which should further increase the publication's usefulness to those interested in animal breeding.

QUESTIONS IN PARLIAMENT

Fowl Pest (Newcastle Disease)

Replying to questions on the above, Mr. Williams, Minister of Agriculture, said: The importation of live poultry and hatching eggs from countries where fowl pest is known to exist is not now being permitted. The question of further measures is under consideration.

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Food Losses Through Snow and Flood

Dr. Edith Summerskill, Parliamentary Secretary, Ministry of Food, states in a written reply that the effects of the recent losses of sheep, lambs, and cattle will be spread over a period of about three years. The direct loss in 1947-48 of stock coming forward for slaughter as distinct from losses resulting from reductions in breeding stocks is estimated at about 3 per cent. of our annual consumption of rationed meat. The loss of potato stocks was equivalent to some 1½ per cent. of our annual potato consumption. The loss of wheat acreage directly attributable to frost and flood would have produced, on the basis of average yields, a quantity of millable wheat equivalent to about 1½ per cent. of our annual consumption of millable wheat. A far more serious loss—about 4½ per cent.—resulted from the wet autumn and the consequent inability of farmers to sow the desired acreage of winter wheat.

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Research Projects

Mr. Dumpleton asked the Secretary of State for the Colonies what research projects recommended or approved by the Colonial Social Science Research Council are now in hand.

Mr. Creech Jones: The research projects recommended by the Colonial Social Science Research Council which have been approved by me or my predecessor and are still in hand are as follows:—

Research Project	*Name of Person or Body by whom being carried out.*
Ethnographic survey of Africa	International African Institute.
Social survey of Zanzibar	Professor Batson.
Sociological survey of peasant community in Jamaica.	Miss Edith Clarke, under supervision of the London School of Economics.
Study of the economic and cultural status of women in the British Cameroons.	Miss P. Kaberry, under supervision of the International African Institute.
Study of the economic and social aspects of Colonial Policy during the war period.	Mr. F. J. Fisher.
Preparation of Handbook of African Languages.	International African Institute.
Legal research into land tenure in the Gold Coast based on investigation of native court records.	Mrs. I. C. Matson.
Study of French administration in North Africa.	Miss S. Eyre Crowe, under the supervision of the University of Oxford.
Field studies in connection with land and settlement problems in Kenya.	Government of Kenya.
Investigation of the grammatical structure of Kikuyu.	Rev. Lyndon Harries.
Survey of mental illness and juvenile delinquency in West Africa.	Dr. G. Tooth.
Ethnographic study of the Mende, Sierra Leone.	Dr. K. Little.
Survey of factors affecting the efficiency of African labour in Kenya.	Dr. C. H. Northcott.
Investigation of secondary school science teaching in West Africa.	Mr. F. Smithies.
Anthropological research among Tonga, Ngoni, and Yao.	Rhodes Livingstone Institute.
Linguistic study of Ibo	Miss M. M. Green.
Linguistic study of Ganda	Dr. A. N. Tucker.
Colonial Research Fellowships	
Method of measurement of national income of Colonial territories. Computation of national income, production and expenditure of Northern Rhodesia and Nyasaland.	Miss P. M. Deane.
Survey, based on field studies of earnings and family budgets, of the occupational structure of representative communities in the Gold Coast as influenced by war-time Government expenditure.	Miss P. Ady.
Study of the political organization of typical communities in the Gambia.	Mr. D. P. Gamble.
Study of relations between the content of education and the after-school occupational life of girls and women in the Gold Coast.	Miss C. Fletcher.
Linguistic and cultural study of Nadrami Arabia.	Dr. R. B. Serjeant.
Psychological study of the adaptation of the individual to life in a social community, and of different native social communities to contact with Western society, in Northern Rhodesia.	Mr. M. G. Marwick.

Unfit Carcases

Mrs. Ridealgh asked the Minister of Food to what extent the large number of cattle which died due to exposure in the recent cold weather were fit for human consumption; and how many of the carcases were sent to market to be sold in the usual way.

Mr. Strachey: Unfortunately, only slaughtered animals are fit for human consumption, and none of those which died of exposure could be used in this way.

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Animal Clinics

Mr. Janner asked the Minister of Town and Country Planning if he will include in the "Planning Manual" the suggestion that local authorities wishing to establish animal clinics should consult the R.S.P.C.A. which, with the veterinary profession, has had considerable experience in this matter.

Mr. Silkin: I will consider my hon. Friend's suggestion. It would, however, appear to be inappropriate that the "Planning Manual" should go beyond a general indication of the desirability of consultation with specialized bodies in matters of the kind referred to.

Mr. Janner: Will my right hon. Friend consider this matter very favourably because, after all, the Society holds a unique place and has a unique experience in these matters?

Mr. Silkin: Yes, Sir. I have said that I am considering it and if the Society has a unique place, then inevitably it will be consulted.

NOTES AND NEWS

Diary of Events

May 5th.—R.C.V.S. Animal Management Examination, commencing in Edinburgh.

May 6th.—R.C.V.S. Council Election. Last date for receipt of nominations.

May 7th.—Special Meeting of the N.V.M.A. Technical Development Committee, at 36, Gordon Square, W.C.1, 11 a.m.

May 7th.—Meeting of the Editorial Committee, N.V.M.A., at 36, Gordon Square, W.C.1, 2.30 p.m. **[Brought forward to first Wednesday in the month.]**

May 8th.—**Special Meeting of Council, N.V.M.A.**, at the Conway Hall, Red Lion Square, London, W.C.1, 2 p.m.

May 8th.—Special Meeting of N.V.M.A. General Purposes and Finance Committee, 36, Gordon Square, W.C.1, 11 a.m.

May 8th.—Meeting of the Derbyshire Division, N.V.M.A., Midland Agricultural Institute, 2 p.m.

May 9th.—Meeting of N.V.M.A. Parliamentary and Public Relations Committee, 36, Gordon Square, W.C.1, 11 a.m.

May 9th.—Annual General Meeting of the Southern Counties Division, N.V.M.A., at Winchester (Cadena Restaurant), 2 p.m.

May 10th.—Meeting of the Society of Women Veterinary Surgeons, at 69, Great Peter Street, London, S.W.1, 2 p.m.

May 15th.—Annual Meeting of the Dumfries and Galloway Division, N.V.M.A., at Carlisle (Crown and Mitre Hotel), 11 a.m.

May 20th.—R.C.V.S. Council Election. Voting papers to be issued.

May 21st.—Spring Meeting of the Eastern Counties Division, N.V.M.A., at Bury St. Edmunds (Angel Hotel), 2.30 p.m.

May 23rd.—R.V.C. Students' Union Society Annual Ball, Grosvenor House, Park Lane, W., 8 p.m. to 1 a.m.

May 27th.—R.C.V.S. Council Election. Voting papers to be returned.

May 30th.—Meeting of the Royal Counties Division, N.V.M.A., at Oxford (Forum Restaurant), 2.30 p.m.

June 3rd.—R.C.V.S. Annual General Meeting.

June 3rd and 4th.—R.C.V.S. Committee Meetings.

June 5th.—R.C.V.S. Committee and Council Meetings.

June 13th.—R.A.V.C. Annual Dinner, Grosvenor House, London.

June 26th and 27th.—R.C.V.S. Written Examinations.

July 28th—Aug. 1st.—N.V.M.A. Annual Congress in Edinburgh.

Questionnaire to Divisions, N.V.M.A.

Will members of the Association, who have not already done so, kindly complete the questionnaires sent to them by their Divisional Secretaries, and return them without delay either to those deputed to collect these replies in their Divisions, or, if no special arrangements have been made, to the General Secretary, N.V.M.A., direct.

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Swine Fever (Crystal Violet) Vaccine

As intimated in these columns last week, the Ministry of Agriculture and Fisheries is now able to commence the issue of swine fever (crystal violet) vaccine as from May 15th, 1947. Further particulars can be obtained from the Veterinary Laboratory, Ministry of Agriculture and Fisheries, New Haw, Weybridge, Surrey, from where the vaccine will be issued.

It will be recalled that, following some work in America, this vaccine was prepared and tested in this country both in the laboratory and in the field; the results of the experiments and trials showed that the vaccine was capable of setting up a high degree of immunity which was maintained at a sufficiently high level to enable pigs to withstand artificial infection with swine fever virus for about twelve months. (See *Vet. Rec.*, Sept. 9th, 1944, Vol. 56, No. 37, pages 327-330.)

It is hoped that during the next two years the vaccine will be used widely throughout the country; to facilitate this wide use arrangements have been made whereby the vaccine will be sold at a price less than the actual cost of manufacture. The agreed present price is 1s. per 5 c.c.; it is anticipated that some financial assistance will be given by the Government for the next two years.

Vaccine will be available in bottles containing 10 c.c.; the recommended dosage is 5 c.c. for pigs under 70 lb. weight and 10 c.c. for pigs over 70 lb. weight.

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N.F.U. Agricultural Disaster Fund Matinée

A charity matinée of "She Wanted a Cream Front Door" is being given at the Apollo Theatre, London, on Tuesday, May 6th. The proceeds will go to the N.F.U. Agricultural Disaster Fund. Tickets are as follows: Stalls, 25s.; Dress Circle, 21s.; Upper Circle and Pit, 16s. 6d.; Gallery, 5s.

Any members who are interested can obtain tickets from the theatre, the usual agencies, of from the offices of *The Farmer and Stock-Breeder*.

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R.C.V.S. Council Election

Publication of Candidates' Addresses

The election addresses of candidates for Council, R.C.V.S., will be published in our issue of May 17th. Those who desire to submit such addresses for publication are requested to note that they must be received by the Editor of *The Veterinary Record*, 36, Gordon Square, London, W.C.1, not later than **Monday, May 12th**, and that they must be limited to 250 words.

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New Appointments to the Staff of the Ministry of Agriculture

As notified in recent issues, Council, N.V.M.A., has decided that no advertisements for appointments to the veterinary staff of the Animal Health Division of the Ministry of Agriculture shall be accepted for *The Veterinary Record* pending the settlement, in a manner satisfactory to the Association, of the question of the status and salaries of the Veterinary Officers of the Division.

In the meantime, any members of the profession who may, nevertheless, contemplate applying for such posts, should these be advertised elsewhere, are requested first to communicate with the General Secretary of the Association at 36, Gordon Square, London, W.C.1.

SOCIETY OF WOMEN VETERINARY SURGEONS

As will be seen in our notices of meetings columns the Society of Women Veterinary Surgeons is holding a meeting on May 10th to discuss a problem which Council, N.V.M.A., at its last meeting regarded as of some urgency. Speakers of considerable and varied experience have been invited and the discussion is expected to cover a wide range, involving all the problems concerning the provision of treatment for animals of the poor and the relationship of the profession to the various animal welfare societies. While the Society of Women Veterinary Surgeons is always pleased to welcome visitors to its meetings, on this occasion in particular, in view of the importance of this subject to all practising members of the profession, the Society hopes that any member of the profession who cares to do so will not only come to the meeting but also join in the discussion.

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PERSONAL

Births.—STRAITON.—On April 14th, 1947, to Loraine, wife of E. C. Straiton—a son.

WALKER.—On March 24th, 1947, to Florence, wife of R. B. Walker, M.R.C.V.S., 14, Ashfield, Great Horton Road, Bradford—a daughter.

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Marriages.—HEWETSON—LIVESEY.—On April 26th, 1947, at St. Cuthbert's Parish Church, Southport, Harry Raynor Hewetson, M.R.C.V.S., Southport, to Marjorie, younger daughter of John Livesey, of Southport and Wigan.

LAMBERT—TULLOCH.—On April 10th, 1947, at St. Mary's Church, Doncaster, Patrick Simpson Lambert, B.SC., M.R.C.V.S., of Edinburgh, and Joan Esme Tulloch, of Doncaster.

MORETON—WILSON.—At St. Nicholas Church, Warwick, on April 22nd, 1947, Marjorie, daughter of Mr. and Mrs. Moreton, Heathcote Hill Farm, Warwick, to Andrew Wilson, M.R.C.V.S., of Lennoxtown.

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Golden Wedding.—ROBERTS—PANKS.—On April 10th, 1897, at the Parish Church, Diss, Norfolk, Horace L. Roberts, M.R.C.V.S. (Fellowship 1905), to Miss M. J. Panks, only daughter of (now the late) Mr. and Mrs. George Panks, of the Crown Hotel, Diss.

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R.C.V.S. OBITUARY

M'Connell, Howard, J.P., The Mall, Armagh. Graduated Glasgow, May 22nd, 1893. Died April 15th, 1947.

WOLSEY, Thomas, Smallburgh Hall, Norwich. Graduated London, July 15th, 1898. Died April 7th, 1947.

MR. HOWARD M'CONNELL, M.R.C.V.S.

Mr. Howard M'Connell, M.R.C.V.S., whose death we record above with much regret, retired from the staff of the Ministry of Agriculture about a year ago. He was a Unionist member of Armagh City Council.

Surviving him are his wife and two sons, one of whom, Mr. Howard Louis M'Connell, M.R.C.V.S., is a divisional veterinary surgeon for the Ministry of Agriculture, and the other an official of the Bank of Ireland.

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COLONIAL UNIVERSITY GRANTS ADVISORY COMMITTEE

The general principles which should guide the promotion of higher education, learning and research and the development of universities in the Colonies were set out in the report of the Asquith Commission presented in July, 1945. In accordance with a recommendation of the Commission an Inter-University Council for Higher Education in the Colonies was set up in March, 1946. The objects of the Council are to strengthen the co-operation between the United Kingdom and colonial universities and to help develop coloial colleges to university status.

A further recommendation of the Asquith Commission has now been implemented by the appointment of a Colonial University Grants Advisory Committee under the chairmanship of Sir Hector Hetherington, Vice-Chancellor of the University of Glasgow. The first main task of the Committee will be to advise on the apportionment of the £4½ millions which has been allocated for higher education in the colonies under the Colonial Development and Welfare Act.

The Colonial University Grants Advisory Committee will maintain close liaison with other committees on education. One of its members is Sir Walter Moberly, Chairman of the University Grants Committee which is responsible for the allocation of Government grants to universities in this country. On academic aspects the Committee will be guided by the Inter-University Council, whose Secretary has also been appointed Secretary of the new Committee.

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COLONIAL INSECTICIDES COMMITTEE

The Secretary of State has set up a Colonial Insecticides Committee under the chairmanship of Professor Sir Ian Heilbron, D.S.O., F.R.S., Professor of Organic Chemistry at the Imperial College of Science and Technology. The Vice-Chairman is Professor P. A. Buxton, F.R.S., Professor of Entomology at the London School of Hygiene and Tropical Medicine, who spent a substantial part of 1945 and 1946 in East, Central and South Africa studying the organization of tsetse and trypanosomiasis research on behalf of the Colonial Office. Colonial Dependencies have been invited to nominate correspondents who will act as a liaison with the Committee.

The new synthetic insecticides D.D.T. and gammexane hold out much promise of success in the war against major diseases and pests in the tropics. In early 1945 a grant of £2,000 was made under the Colonial Development and Welfare Act to British Guiana to finance field trials of D.D.T. as an insecticide and larvicide. Later in the same year a Colonial Insecticide Research unit was set up for work in East Africa and a research grant of £41,500 over a period of two years was made under the Act. The control of this research unit, previously held by the Tsetse Fly and Trypanosomiasis Committee, now passes to the Insecticides Committee which will be responsible for insecticide research, including field work, and the distribution of the latest scientific information on the use of insecticides.

D.D.T. investigations in British Guiana, which is very malarial in places, began in February, 1945, and have been continued by a Government malarialogist. The work, though on a large scale, is still experimental, but early this year the Yellow Fever Control and the Malaria Investigation Service were merged into a single Mosquito Control Service. An expanding campaign is now being conducted for the control of malaria, yellow fever and filariasis throughout the Colony.

The Colonial Insecticide Research Team began work in Uganda in November, 1945, and dealt with the tsetse fly, the vector of sleeping sickness. Tests were carried out at first on two small islands in Lake Victoria, gammexane solution of D.D.T. being sprayed over small scattered patches. An enormous number of routine laboratory tests was carried out at the same time on the toxic effects of the insecticides over a period. By maintaining the insecticides by repeated applications flies were reduced by 99 per cent. in one experiment.

Trials against malaria have also been undertaken. Solutions of the two insecticides have been applied to the internal surfaces of native huts so that mosquitoes entering and settling on these surfaces would become affected by the insecticide. Generally speaking these experiments show that oil solutions of both D.D.T. and gammexane are effective to an appreciable extent in checking the seasonal rise of malaria.

Good methods of the application of the synthetic insecticides are being worked out and should constitute an enormous help to the betterment of public health. In January, 1946, the Ministry of Supply produced a pamphlet "Some Properties and Applications of D.D.T.", which summarizes the information available at that date on the practical applications of D.D.T.

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ICE CREAM REGULATIONS

The Ministry of Health have made an Order (S.R. & O. 1947, No. 612), which came into operation on May 1st, 1947, to control from a bacteriological point of view the manufacture of ice cream. The method proposed for controlling the bacterial cleanliness of the product is treatment by heating to not less than 150° F. for 30 minutes, or 160° F. for ten minutes, with the precaution of immediate reduction of temperature to 45° F. Subsequent storage at a temperature of 28° F. or lower is prescribed. The general hygienic cleanliness of the product is controlled by requiring all apparatus and utensils used in manufacture, storage and distribution to be clean. For the purpose of enforcing the regulations reliance is placed mainly on inspection by local authorities of manufacturing processes and conditions of distribution, for the Ministry admits its inability to devise any satisfactory bacteriological standard of cleanliness which could be used as a statutory test. It does, however, recommend the methylene blue test, which, as in the case of milk, can be used as a control test by manufacturers, for it will give a rough computation of the number of viable bacteria present in the sample. Any person who fails to comply with the provisions is liable in the case of the first offence to a fine not exceeding £20.

MILK PRODUCTION ADVANCE

Recent Ministerial congratulations to the dairy farming community on achievements which have enabled an increase in milk allowance to non-priority consumers to be made despite the universal farm-operation setback for which the winter weather disasters were responsible, are indeed well deserved.

In this connection the *Farmer and Stock-Breeder* points out that record production has been achieved nearly every month, particularly in the critical winter period. The annual report of National Milk Records discloses an increase of over 20 gallons a year in the average yield per cow. "There could be no finer example of increasing efficiency in the face of all obstacles. Labour costs have gone up and there has been no great increase in the numbers employed. As to feeding-stuffs, there was a serious and sudden cut during the autumn of 1946. The pattern of advancing efficiency is, therefore, clearly discernible among the 19,085 recorded herds. That this encouraging result has been achieved while home-grown feeding-stuffs predominate is all to the good. It is still further proof of the adaptability and skill of the British farmer and his workers.

"There has been an increase of 1,662 in the number of recorded herds, but over three-quarters of the dairy cows of England and Wales are still unrecorded. Possibly an increase in the cost of recording, coupled with the labour shortage, has applied a brake. The advantages of recording, however, are so clear that it can only be a matter of time before non-recording will be the exception.

"In looking towards further increases in milk production we should bear in mind that next autumn we may feel the repercussions of the recent bad weather. Such severe weather will reduce the number of heifers coming to the bull. Hence there will be a lower percentage of October and November calvers."

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VETERINARY EDUCATIONAL TRUST

The Gilbey Collection

The executors of the late Mr. Tresham Gilbey have arranged for an exhibition of his collection of Sporting Pictures at the Galleries of Messrs. Ellis & Smith, 16b, Grafton Street, London, W.1, from May 12th to 22nd inclusive, prior to the pictures going to Christies for sale by auction on May 30th, 1947.

Admission is free, but Mr. Jack Gilbey-Ellis has kindly prepared a fully descriptive and illustrated catalogue, price 2s. 6d., the proceeds of the sale of which will be given in its entirety to the Veterinary Educational Trust.

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NATIONAL PONY SOCIETY

Of our nine distinct breeds of pony, the most spectacular—the Welsh—filled the strongest classes at the National Pony Society's recent show at Roehampton. Chief interest, however, lay in the polo classes, when two great supporters and players of the game, which is being gradually revived in the country, Lord Digby and Lord Cowdray, had notable successes. Lord Digby's Ack Ack, by Azra, a good-looking chestnut, won the stallion class and also the Tufton Cup for the best polo-bred pony in the show. Lord Cowdray's chestnut, Milk Bar, a gelding by Tabasin, won the *Country Life* Cup for the best polo pony.

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Sheep Scab:

Westmorland.—Keld Mead, Melton, Penrith, Cumberland (April 24th).

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A special lecture entitled "Practical Standards in Milk Treatment and Distribution: Some of the Ways in which they have been Achieved" will be given by Mr. Arthur G. Enoch, M.I.MECH.E., at the Smithfield College of Food Technology, Eagle Court, St. John's Lane, E.C.1, on Tuesday, May 6th, at 5.30 p.m. All interested in the milk industry are cordially invited.

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Weekly Wisdom

It is not too late to arrest the decline of the cultural influence of the horse in this country, but things have gone pretty far.—Major Lewis Hastings: "Dragons are Extra."

H.M. STATIONERY OFFICE PUBLICATIONS

The undermentioned have been published recently. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office.

	Price net s. d.	*Post free* s. d.
House of Lords Papers and Bills (Session 1946-47):		
58. National Health Service (Scotland) Bill ...	1 6	1 8
60. Radioactive Substances Bill. (H. L.) ...	0 4	0 5
61. Preservations of the Rights of the Subject Bill. (H. L.)	0 3	0 4

H.M. Stationery Office Publications (Belfast)

(Publications of the Government of Northern Ireland)

Statutory Rules and Orders, 1947:		
21. Ministry of Agriculture—Warble Fly (Dressing of Cattle) (Northern Ireland) Order, 1947	0 1	0 2
28. Ministry of Agriculture—Poultry Diseases Order (Northern Ireland), 1947	0 2	0 3

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The Technique of "Aimed Injections"

A Note on Some Work being carried out in Hamburg

[The following account has been received from Major L. H. Sparrow, R.A.V.C., now with the Veterinary Section, Schleswig Holstein Regional Food Team, B.A.O.R.]

Dr. Rudolf Degkwitz is chief of the Department of Pediatrics at the Eppendorfer Hospital in Hamburg, and Dean of the Medical Faculty of the University of Hamburg. He is highly regarded by his associates at the University, and is considered an outstanding scientist. Dr. Degkwitz gives the impression of being a sound and able investigator who is not likely to entertain "half-baked" ideas. Associated with him in the chemical part of his research work has been Dr. Cadenbach of the Department of Chemistry of the University.

Dr. Degkwitz's principal research during the last nine years (two of which he spent in a concentration camp) has been directed to developing his idea of "aimed injections." The method comprises intravenous injection of water-insoluble particles of varying shape and size in aqueous suspension, it being claimed that, depending on the shape and size of the particle, it can be made to lodge in a chosen site. For example, the lungs, liver, spleen or bone marrow can selectively absorb a substance under examination.

The eventual object of the technique is that therapeutic agents could be concentrated in the lung, liver, spleen and bone marrow by physical means, and thus made to exercise their maximum effect on these organs with a minimum amount of toxicity for other organs. According to Dr. Degkwitz, the diameter of the capillaries of these organs varies in size from largest to smallest in this order: lung, liver, spleen, bone marrow. If particles of relatively large size are injected intravenously, they will be filtered out by the lung capillaries and thus be concentrated in the lung. Particles of smaller size will pass through the lung capillaries and be removed and concentrated in the liver; still smaller particles will pass through both lung and liver and be retained by the spleen. The smallest particles with which he works will pass through all these organs and be concentrated in the bone marrow. According to Dr. Degkwitz, two other considerations influence this process, *i.e.*, the shape of the particle and the presence of reticulo-endothelial cells in the liver, spleen, and bone marrow. In the case of the lung, he thinks the mechanism of filtration is purely mechanical. Spherical particles pass through a capillary bed more readily than do needles because the latter tend to catch in the convolutions of the capillaries. The particles with which Dr. Degkwitz works vary in size from 0·00002 mm. to 0·00005 mm.

The problem was to obtain particles of the proper size that would have a therapeutic effect. The clue to the solution of part of the problem was found in inter-cellular fibres. These fibres are crystalline in structure, but under ordinary circumstances crystals form only from pure solutions. However, the medium in which these crystals are formed is not a pure solution but contains many dissolved substances. He reasoned, therefore, that protoplasm must contain substances favouring crystallization. Upon investigation, he found that protoplasm did in fact contain substances which promote crystallization, and these are lipoids, soaps, lecithin, and phosphatids. Albumin, glycogen, and certain colloidal substances prevent or hinder crystallization. Dr. Degkwitz theorized that the size of crystals could be controlled by altering the balance in the solution between substances that promote and those that hinder crystallization.

A series of experiments was undertaken by Dr. Degkwitz and Dr. Cadenbach, which eventually resulted in their being able to make particles of any desired size of substances which are soluble in organic solvents such as alcohol or acetone but insoluble in water. They have worked with many such substances, including cholesterol, Sudan red, and sulphanilamide and its derivatives.

Their technique briefly is as follows: They dissolve the substance in the organic solvent and pour it into water. Crystallization starts at once and crystal size can be accurately controlled by adding an inhibiting agent, such as albumin, in the right amount. Other factors such as temperature, purity of the solution, and concentration of the substance in the organic solvent, influence the speed of the reaction. Dr. Cadenbach says that in the course of crystallization the first particles formed are always spherical, and as the particles increase in size, characteristic crystals in the shape of needles or plates are formed. He says that the spheres are isotropic and the largest needles are anisotropic. The spheres according to Dr. Cadenbach, are not true crystals but conglomerates of particles or molecules. In the laboratory, Dr. Cadenbach demonstrated the preparation of spheres and crystals of different sizes from cholesterol.

Dr. Degkwitz showed a motion picture on the effects of 0·001 per cent. suspensions of cholesterol of different particle size on *Paramoecium caudatum*. The motion picture (in colour) also showed animals injected intravenously with suspensions of large particles of Sudan blue. The lungs of these animals were quite blue, whereas the liver and other organs were of natural colour. Other animals injected with the same substance but of smaller particle size showed normally coloured lungs but a blue liver. The motion picture also showed cultures of Paramoecium to which cholesterol particles of different sizes were added. In the culture to which large particles had been added, the Paramoecia were unaffected, whereas in the culture to which cholesterol particles of smaller size were added, the Paramoecia rapidly became motionless and died. This demonstrated the great uniformity of the particle size. The large particles were just too large to be ingested by the Paramoecia and consequently they remained unaffected. The smaller particles were ingested, however, and killed the protozoon.

Dr. Degkwitz has worked with sulphonamide compounds to some extent, but this work was interrupted by his confinement to a concentration camp for anti-Nazi activities. He has also worked with Sudan red in the treatment of tuberculosis. Sudan red was selected because of its affinity for the waxy capsule of the tubercle bacillus. Dr. Degkwitz states that Sudan red kills tubercle bacilli in culture in a concentration of from 1 to 20,000 to 1 to 40,000, a concentration which he says is non-toxic. In animal studies both bovine and human strains were used in guinea-pigs and rabbits. The bovine strain is less satisfactory because the course of the disease is too acute. About 100 to 150 animals were used in these experiments. The guinea-pigs were inoculated with 10,000 to 20,000 human tubercle bacilli. After about two weeks 1 mg. of Sudan red per animal was injected intraperitoneally twice weekly. Treatment was continued for four to eight weeks. Untreated controls all died within eight to ten weeks. About 70 per cent. of the treated animals survived. At autopsy, treated animals showed no evidence of tuberculosis.

During the two years Dr. Degkwitz spent in the concentration camp, he tried Sudan red on 30 or 40 per cent. of his starving companions about 25 per cent. of whom had tuberculosis. No results were obtained, but none were really expected because all his patients were actually starving, and no treatment could have been expected to have been successful under these conditions.

To date the only clinical application has been the preparation of a contrast medium manufactured by Schering A.G., for use in diagnostic work on the liver and spleen. The Schering product is a suspension of tri-hydriodide of ethyl linoleinate ($CH_3 \ldots CH_2$-ChI-Ch_2-ChI-CH_2CHI . . . $COOC_2H_5$) and is named "Hepatoselectan" when used for liver and spleen work, but the same product under the name of "Vasoselectan" is supplied as a contrast medium for arteriography. The preparations for injections are said to be stable for a period of two years. "Aimed injections" of Hepatoselectan have been used by Dr. Degkwitz as a procedure for the early diagnosis of cancer of the liver and spleen.

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"THE FIRST ATTESTED HERD BOOK"

In its issue of April 11th the *Farming News*, under the above heading, observes: "It looks as though the Ayrshire Cattle Society intends to make more history. The new chapter in prospect, moreover, takes a shape that is bound to command practically world-wide attention.

"The council of the Society, we understand, has decided to give notice that three years hence no entries will be accepted for the Herd Book unless from herds that hold attestation certificates. This is a bold move, which will excite interest wherever breed registration is practised.

"The effect of this decision will be that by February, 1950, the Society is committed to adopt a policy in conformity with this notice. How complete the application of that policy may be in the initial stages remains to be seen. That is an open question for the future.

"For the present it is enough to know that the native dairy breed of Scotland which has led all others in the two movements which have influenced dairy cattle breeding more than any other factors during the past 40 years—the official recording of yields of individual cows at regular intervals and the clearing of herds of tuberculosis—should now be seriously addressing itself to accepting only attested stock in its herd-book registrations.

"Despite questions as to the wisdom of this proposal . . . we agree that a breed society that is pushing for eradication areas—a society that has every right and title to have its homeland selected as the first British area to qualify for that great distinction—cannot afford to neglect a corresponding clean-up in its own future registrations of stock."

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FOURTH INTERNATIONAL CONGRESS FOR MICROBIOLOGY

The International Association of Microbiologists is organizing the Fourth International Congress for Microbiology, to be held at Copenhagen during July 20th to 26th, 1947. General meetings will be addressed by Dr. F. C. Bawden (Rothamsted Experimental Station) on viruses, Professor S. A. Waksman (New Jersey State Agricultural Experiment Station) on antibiotics and life, Professor C. H. Werkman (Iowa State College) on the assimilation of carbon dioxide, and Professor O. Winge (University of Copenhagen) on yeast in modern genetics. The nine sections of the Congress will be devoted respectively to general microbiology, medical and veterinary bacteriology, viruses and virus diseases, serology and immunology, variation and mutation in micro-organisms, plant pathology and mycology, soil and water microbiology, dairy and food microbiology, and industrial microbiology. The President of the Congress is Dr. Th. Madsen; and the Hon. General Secretary is Dr. M. Bjorneboe, Kommunehospitalet, Copenhagen. Those wishing to take advantage of official arrangements for hotel accommodation should communicate with the Hon. General Secretary not later than May 15th.

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Export certificates issued during January, February and March for pedigree cattle totalled 155 for males and 54 for females. Eire took 21 Aberdeen Angus bulls, while 68 Shorthorn bulls were for Argentina. The list includes practically all the British breeds. For sheep the totals were 66 males and 156 females, including 100 females (Hampshire Downs) to Czechoslovakia. The certificates for 88 pigs included 50 Large White males for Italy.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

Correspondents should write as briefly as possible and letters should not exceed 350 words.

SUPERFECUNDATION

Sir,—A 14-year-old hunter mare, thought never to have foaled before, was put to the stallion, and six weeks later when showing signs of oestrus was covered again. The pregnancy resulting from the first service should have terminated on April 2nd, but the mare aborted twins on March 4th. I examined them that day and it was clearly evident from size and hair growth that the difference in their age must be about six weeks.

Yours faithfully,

R. W. Hartley.

7, The Square,
Petersfield, Hants.
March 6th, 1947.

Willington Medicals, Ltd.

Would veterinary surgeons please return all empty cases they have lying around? At the present moment we have over 900 cases which have been out for months with veterinary surgeons, and this is seriously hampering us in despatching goods. If the veterinary surgeons have any difficulty in getting the railway company to pick up these empties, would they please let us know and we will see that they are collected. May we ask veterinary surgeons to treat this matter as one of urgency, as it is impossible for us to obtain new cases anywhere.